KROTOV, V.A.

"Western Siberia" by M.I. Pomus. Reviewed by V.A. Krotov. Izv. AN SSSR. Ser. Geog. no.3:134-138 My-Je '57. (MIRA 10:12)
(Siberia--Economic geography)
(Pomus, M.I.)

SHERSTOBOYEV, Vadim Nikolayevich; SHOTSKIY, Vladimir Porfir'yevich; KROTOV, V.A., red.; STRILEVA, G.F., red.; SOROKINA, T.I., tekhn.red.

[Agricultural regions of Irkutsk Province; materials on the agricultural regionalization of Irkutsk Province] Sel'skokhozialstvennye raiony Irkutskoi oblasti; materialy po sel'skokhozialstvennomu raionirovaniiu Irkutskoi oblasti. Irkutsk, Irkutskoe knizhnoe izd-vo. No.2. 1958. 75 p. (MIRA 14:4)

(Irkutsk Province--Agricultural geography)

KRotov, V. A.

3(5) PHASE I BOOK EXPLOITATION SOV/2154

Akademiya nauk SSSR. Vostochno-Sibirskiy filial

Syr'yevyye resursy legkikh metallov Vostochnoy Sibiri, tom. 2(Light Metal Resources of Eastern Siberia, Vol 2) Moscow, 1958. 298 p. (Series: Its: Trudy, vyp. 13) 1,200 copies printed.

Editorial Board: N.S. Alekseyev, Ye. P. Bessolitsyn, V.S. Drachev, A.F. Li, Doctor of Geological and Mineral Sciences, and Ye. I. Khazanov (Resp. Ed.) Candidate of Technical Sciences; Ed. of Publishing House: V.K. Shlepov; Tech. Ed.: P.S. Kashina.

PURPOSE: This issue of the Eastern Siberian Branch Transactions is of interest to structural, exploration and mining geologists, mineralogists, and metallurgists in the light metal industries.

COVERAGE: This collection of articles is a compilation of the reports presented at the third coordinated conference on "The Creation of a Light Metals Industry in Eastern Siberia Based on Local Ores" organized by the Laboratory of Electrometallurgy of the Eastern Siberian Branch of the AN SSSR in October, 1956. It met for the purpose of promoting coordination between the activities

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of the power generation combines and the fast developing light metals industry of Eastern Siberia. The reports indicate that large aluminum and titanium-magnesium combines are being constructed in the Krasnoyarsk Kray and the Irkutsk Oblast These areas provide the cheapest sources of coal and electrical energy. Individual articles also report on the following subjects: general questions in the development of the light metals industry in Eastern Siberia, sillimanite ores, nepheline syenites, bauxites, magnesium ores, etc. References accompany each article.

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PART I. SILLIMANITES AND THEIR UTILIZATION

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BUYANTUYEV, B.R., red.; KROTOV, V.A., red.; ROZENFEL'D, Sh.L., red.; KONYUKHOV, V.D., red. izd-va.; BAKOVETSKAYA, V.S., red. izd-va.

[Problems in the development of industry and transportation in the Buryat A.S.S.R.] Problemy razvitiia promyshlennosti i transporta Buriatskoi ASSR. Moskva, 1958. 305 p. (MIRA 11:11)

1. Akademiya nauk SSSR. Institut ekonomiki.
(Buryat-Mongolia--Industries)
(Buryat-Mongolia--Transportation)

KROTOV, V.A.

Further increase in productive forces of Eastern Siberia. Izv.Sib.otd.AN SSSR no.12:3-11 '58. (MIRA 12:3)

1. Vostochno-Sibirskiy filial Sibirskogo otdeleniya AN SSSR.
(Siberia, Eastern--Economic conditions)

GRIGOR'IEVA, Anna Ageyevna; KROTOV, I.A., prof., red.; STRILEVA, G.F., red.; PECHERSKAYA, T.I., tekhn.red.

[Western regions of the Bratsk-Tayshet Industrial Center; economic-geographical features] Zapadnye raiony Bratsko-Taishetskogo promyshlennogo kompleksa; ekonomiko-geograficheskaia kharakteristika. Irkutsk, Irkutskoe knizhnoe izd-vo, 1959. 70 p. (MIRA 13:3)
(Chuna Valley--Economic conditions)
(Biryusa Valley--Economic conditions)

SOV/10-59-1-6/32

AUTHORS: Krotov, V.A., Pomus, M.I., and Rikhter, G.D.

TITLE: The Development of Productive Forces Under the Seven Year Plan (Razvitiye proizvoditel'nykh sil v semiletnem plane) Means of the Development of Productive Forces in Eastern Siberia (Puti razvitiya proizvoditel'nykh sil Vostochnoy Sibiri)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya geograficheskaya, 1959, Nr 1, pp 52-63 (USSR)

ABSTRACT: This article outlines the tasks confronting the geographers in connection with the planned development of Eastern Siberia under the seven year plan. These tasks include: 1)intensification of the study of unassessed natural resc rces; 2) taking an inventory of known resources; 3) the study of permafrost; 4) the working out of the seismic and geoindustrial subdivisions of the area; 5) the preparation of maps of soils; 6) the compilation of a 1 : 1,000,000 geological map of Eastern Siberia and a

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series of geomorphological, hydrological, geo-industrial survey maps of all Eastern Siberia; 7) the further explorations of agro-climatic and soil-botanical factors, etc. As the background of these tasks, the article delineates the principal points of the proposed development that calls upon Eastern Siberia to become the Soviets principal producer of timber, furs, hydro-electric power, coal and non-ferrous metals, and one of the largest producers of iron, metal products, chemical products and synthetic plastics. Eastern Siberia's assessed deposits of coal reach over six trillion tons (70% of the total Soviet deposits). The area of forests has an expanse of 338,000,000 hectares. The already-known deposits of iron ore are estimated at 5.3 billion tons. Eastern Siberia has 50% of Soviet hydroelectric resources or over 90 billion kw of potential energy. It has some of the USSR's largest

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deposits of nickel, cobalt, mica, molybdenum, lead, tungsten, gold, diamonds, asbest, graphite, magnesite, talc, alumina, salt and other minerals. The cost-price of electric power produced by hydropower plants on the Angara and Yenisey rivers is expected to be three times cheaper than produced by power centers on the Volga. Brown coal from open coal pits at Krasnoyarsk is five times cheaper than coal from the Donets Basin and three times cheaper than coal from the Kuznetsk Basin. Its cast iron and aluminum are also expected to be the cheapest. On account of their low cost-price, such East Siberian products can bear the rather expensive transportation prices. The authors mention quite a few new industrial, transportation, mining and other projects, and outline in general the contours of new industrial-economic districts, and other data pertaining to the proposed transformation of Eastern

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Siberia into a huge and complex economic unit. They note the difficulties and the auspicious conditions. A series of regional conferences on the development of the productive forces of Eastern Siberia was crowned in August 1958, by a conference in Irkutsk, convoked by the AS of the USSR, the State Planning Commission, and the Council of Ministers of the RSFSR. It was attended by representatives from party-soviet-planning and economic organizations. Over 8,000 scientists and specialists from various branches of the national economy participated in the conferences, which assessed the techno-economic resources of Eastern

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Siberia, and laid down a concrete program of action.

ASSOCIATION: Institut geografii AN SSSR (Institute of Geography of the AS USSR) Vostochno-Sibirskiy filial AN SSSR (Eastern-Siberian Branch of the AS USSR)

KROTOV, V.A.

Development of light-metal metallurgy in Eastern Siberia and problems of scientists. Trudy Vost.-Sib. fil. AN SSSR no.13: 5-7 '58. (MIRA 12:12)

1. Vostochno-Sibirskiy filial AN SSSR.
(Siberia, Eastern--Light metals--Metallurgy)

30(5), 32(0) SOV/30-59-2-7/60

AUTHORS: Pustovalov, L. V., Corresponding Member, Academy of Sciences, USSR, Krotov, V. A., Professor, Shkol'nikov, M. G., Candidate of Economic Sciences

TITLE: The Development of the Productive Forces in East Siberia (Razvitiye proizvoditel'nykh sil Vostochnoy Sibiri)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 2, pp 34-42 (USSR)

ABSTRACT: In the present paper the authors deal with the economic possibilities of East Siberia. They mention the vast deposits of coal and the favorable technical and economic figures of their utilization (Kansko-Achinsk and Irkutsk Basin as well as the deposits of Transbaykal). On the rivers Angara and Yenisey it is possible to construct huge water-power plants at low building costs. Vast deposits of iron ore were also found in the Krasnoyarskiy kray, Irkutskaya oblast' , Yakutskaya ASSR and the Chitinskaya oblast'. Apart from this, East Siberia has rich deposits of diamonds, gold, glimmer, ores of non-ferrous and rare metals, raw material for the production of aluminum, magnesium and titanium. Graphite, asbestos, talc, magnesite, fluor-spar and piezoquartz were also discovered. The chemical substances

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abundantly occurring are: sodium chloride, pure limestone, gypsum, bromine-containing soles and borates. In the course of putting into practice the 7-year plan in the Krasnoyarskiy kray and the Irkutskaya oblast' huge thermal power plants (Nazarovskaya, Irsha-Borodinskaya, Azeyskaya) are to be constructed and the big water-power plant Bratskaya is to be put into operation. These power plants which are united to one Siberian network are to supply also the industrial centers of the Kuzbass and later on also those of the Ural with electric current. Various types of industries are to be established on the basis of the large power plants. The third metallurgical base of the USSR is to be created. In the course of the coming 7 years the construction of the Tayshet metallurgical plant is planned. The present shortage in food in East Siberia is to be done away with by means of corresponding measures. The 7-year plan also provides for the electrification of the Siberian railroad lines. A number of other railroad lines are also to be built (Bam-Tynda-Chul'man; Abalakovo-Usovo). River transport on the Yenisey, Angara and Lena is also to be extended. The Akademiya nauk SSSR (Academy of Sciences of the USSR), its Siberian department and branches, the Sovet po izucheniyu proizvoditel'nykh sil (Council for the

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Study of Productive Forces) together with the Gosplan' SSSR (Gosplan of the USSR) and the Gosplan of the RSFSR, the Sovnarkhozes of the economic administration districts of East Siberia, the scientific branch research and designing prospecting institutions as well as the universities have the task of intensifying the investigation of productive forces in East Siberia.

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KROTOV, V.A., prof.

New stage in the expansion of coal mining in Eastern Siberia.
Trudy Vost.-Sib.fil.AN SSSR no.21:161-163 '59.
(MIRA 13:9)
(Siberia, Eastern--Coal mines and mining)

KROTOV, V. A.

"New Economic Regions of the East Siberia."

report to be submitted for the Intl. Geographical Union, 10th General Assembly and 19th Intl. Geographical Congress, Stockholm, Sweden, 6-13 August 1960.

KROTOV, Viktor Aleksandrovich

[Irkutsk Province; a concise survey of its economic geography] Irkutskaia oblast'; kratkii ekonomiko-geograficheskii obzor. Izd.2., dop. Irkutsk, Irkutskoe knizhnoe izd-vo, 1960. 44 p. (MIRA 15:9)

(Irkutsk Province--Economic conditions)

SOCHAVA, V.B., otv. red.; KROTOV, V.A., prof., otv.red.; GERASIMOV,I.P., akad., red.; POKSHISHEVSKIY, V.V., prof. red.; RIKHTER,G.D., prof., red.; VOROB'YEV, V.V., kand.geogr.nauk, red.; KUDINOVA, L.I., red.; KHMEL'NITSKAYA,Ye.S., red.; SEPPING, N.G., red.; PECHERSKAYA,T.I., tekhn.red.

[Geographical problems of Siberia and the Far East; results of the First Scientific Conference of the Geographers of Siberia and the Far East] Problemy geografii Sibiri i Dal'nego Vostoka; itogi Pervogo nauchnogo soveshchaniia geografov Sibiri i Dal'nego Vostoka. Irkutsk, Irkutskoe knizhnoe izd-vo, 1960. 133 p.
(MIRA 14:5)

1. Akademiya nauk SSSR. Sibirskoye otdeleniye. Institut geografii Sibiri i Dal'nego Vostoka. 2. Chlen-korrespondent AN SSSR (for Sochava)

(Siberia--Geography) (Soviet Far East--Geography)

BARDIN, I.P., akademik, glavnyy red. [deceased]; NEKRASOV, N.N., otv. red.toma; SLAVIN, S.V., doktor ekon.nauk, red.toma; SHKOL'NIKOV, M.G., kand.ekon.nauk, red.toma; LAVRENT'YEV, M.A., akademik, red.; VOL'FKOVICH, S.I., akademik, red.; DIKUSHIN, V.I., akademik, red.; NEMCHINOV, V.S., akademik, red.; VEYTS, V.I., red.; LEVITSKIY, O.D., red.; PUSTOVALOV, L.V., red.; KHACHATUROV, T.S., red.; ROSTOVTSEV, N.F., akademik, red.; POPOV, A.N., red.; GRAFOV, L.Ye., red.; GASHEV, A.D., red.; PROBST, A.Ye., prof., red.; VASYUTIN, V.F., prof., red.; KHOTOV, Y.A., prof., red.; VASIL'YEV, P.V., doktor ekon.nauk, red.; LYUDOGOVSKIY, G.I., kand.tekhn.nauk, red.; LETUNOV, P.A., kand.geol.-mineral.nauk, red.; MAZOVER, Ya.A., red. izd-va; KASHINA, P.S., tekhn.red.

[Comprehensive regional and interregional problems; [conference reports]] Raionnye i mezhraionnye kompleksnye problemy; [trudy konferentsii]. Moskva, Izd-vo Akad.nauk SSSR, 1960. 190 p. (MIRA 14:1)

1. Konferentsiya po razvitiyu proizvoditel'nykh sil Vostochnoy Sibiri, 1958. 2. Chleny-korrespondenty AN SSSR (for Nekrasov, Veyts, Levitskiy, Pustovalov, Khachaturov). 3. Sovet po izucheniyu proizvoditel'nykh sil pri Prezidiume Akademii nauk SSSR (for Nekrasov, Shkol'nikov, Slavin). 4. Predsedatel' Soveta po izucheniyu proizvoditel'nykh sil pri Prezidiume AN SSSR (for Nemchinov). 5. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk im. V.I.Lenina (for Rostovtsev). 6. Deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR (for Panov). (Siberia, Eastern--Economic policy)

BARDIN, I.P., akademik, glavnyy red. [deceased]; KHACHATUROV, T.S., otv. red.toma; SMIRNOV, A.P., zam.otv.red.toma; VERKHOVSKIY, I.A., red. toma; NEKRASOVA, R.I., red.toma; TSENIN, S.S., red.toma; LAVRENT'IEV, M.A., red.; VOL'FKOVICH, S.I., red.; DIKUSHIN, V.I., red.; NEMCHINOV, V.S., red.; VEITS, V.I., red.; LEVITSKIY, O.D., red.; NEKRASOV, N.N., red.; PUSTOVALOV, L.V., red.; ROSTOVTSEV, N.F., akademik, red.; POPOV, A.N., red.; GRAFOV, L.Ye., red.; GASHEV, A.D., red.; PROBST, A.Ye., prof., red.; VASYUTIN, V.F., prof., red.; KROTOV, V.A., prof., red.; VASIL'IEV, P.V., doktor ekonom.nauk, red.; LYUDOGOVSKIY, G.I., kand. tekhn.nauk, red.; LETUNOV, P.A., kand.geol.-miner.nauk, red.; SHKOL'-NIKOV, M.G., kand.ekon.nauk, red.; RODINA, Ye.D., red.izd-va; GUSEVA, A.P., tekhn.red.

[Transportation; proceedings of the Conference on the Development of Productive Forces of Eastern Siberia] Transport; trudy Konferentsii po razvitiiu proizvoditel'nykh sil Vostochnoi Sibiri, Moskva, Izd-vo Akad.nauk SSSR, 1960. 203 p. (MIRA 13:10)

(Continued on next card)

BARDIN, I.P.---(continued) Card 2.

1. Konferentsiya po razvitiyu proizvoditel'nykh sil Vostochnoy Sibiri, 1958. 2. Chleny-korrespondenty AN SSSR (for Khachaturov, Veyts, Levitskiy, Nekrasov, Pustovalov). 3. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk imeni V.I.Lenina (for Rostovtsev). 4. Deyatvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR (for Popov). 5. Zam.predsedatelya Gosplana RSFSR (for Grafov). 6. Chlen Gosplana RSFSR (for Gashev). 7. Institut kompleksnykh transportnykh problem AN SSSR (for Khachaturov, Verkhovskiy, Nekrasova, TSenin, Smirnov).
(Siberia, Eastern--Transportation)

KROTOV, V.A.

ROSTOVTSEV, N.F., akademik, glavnyy red.toma; SOKOLOV, N.S., prof., red. toma; LETUNOV, P.A., kand.geol.-mineral.nauk, red.toma; KUZMICHEV, A.V., kand.biolog.nauk, red.toma; KRYLOV, P.A., kand.biolog.nauk, red.toma; RUZSKAYA, Ye.A., kand.biolog.nauk, red.toma; CHEMBER, B.Ye., kand.biolog.nauk, red.toma; BARDIN, I.P., akademik, glavnyy red. [deceased]; LAVRENT'YEV, M.A., akademik, red.; VOL'FKOVICH, S.I., akademik, red.; DIKUSHIN, V.I., akademik, red.; NEMCHINOV, V.S., akademik, red.; VEYTS, V.I., red.; LEVITSKIY, O.D., red.; NEKRASOV, N.N., red.; PUSTOVALOV, L.V., red.; KHACHATUROV, T.S., red.; POPOV, A.N., red.; GRAFOV, L.Ye., red.; GASHEV, A.D., red.; VASYUTIN, V.F., prof., red.; PROBST, A.Ye., prof., red.; KROTOV, V.A., prof., red.; VASIL'YEV, P.V., doktor ekonom.nauk, red.; LYUDOGOVSKIY, G.I., kand.tekhn.nauk, red.; SHKOL'NIKOV, M.G., kand.ekonom.nauk, red.; KLYUSHKIN, P.A., red.izd-va; DOROKHINA, I.N., tekhn.red.

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ROSTOVTSEV, N.F.---(continued) Card 2.
[Development of the resources of Eastern Siberia: agriculture]
Razvitie proizvoditel'nykh sil Vostochnoi Sibiri: Sel'skoe khozyaistvo. Moskva, Izd-vo Akad.nauk SSSR, 1960. 426 p.
(MIRA 13:6)

1. Konferentsiya po razvitiyu proizvoditel'nykh sil Vostochnoy Sibiri. 1958, Irkutsk. 2. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk im. V.I.Lenina (for Rostovtsev). 3. Chlen-korrespondent Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk im. V.I.Lenina (for Sokolov). 4. Chleny-korrespondenty AN SSSR (for Veyts, Levitskiy, Nekrasov, Pustovalov, Khachaturov). 5. Deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR (for Popov). 6. Zamestitel' predsedatelya Gosplana RSFSR (for Grafov). 7. Chlen Gosplana RSFSR (for Gashev).
(Siberia, Eastern—Agriculture)

KROTOV, V.A.

Development and distribution of the East Siberian economy in 1959-1965. Trudy Vost. - Sib. fil. AN SSSR no.32:6-19 '60. (MIRA 14:4)

(Siberia, Eastern—Economic policy)

KROTOV, V.A.; GRIGOR'YEVA, A.A.

The Irkutsk Economic Administrative Region. Trudy Vost.-Sib. fil. AN SSSR no.32:20-35 '60. (MIRA 14:4)
(Irkutsk Province—Economic geography)

KROTOV, V.A.

Shifts in the distribution of productive forces in Eastern Siberia. Izv. Sib. otd. AN SSSR no.10:20-30 '61. (MIRA 14:12)

1. Institut geografii Sibiri i Dal'nego Vostoka Sibirskogo otdeleniya AN SSSR, Irkutsk.
(Siberia, Eastern--Industries)

KROPACHEV, A.M.; KROTOV, V.A.

Trace elements in metamorphic rocks of the western slope of the Central Urals. Dokl. AN SSSR 139 no.3:709-712 Jl '61. (MIRA 14:7)

1. Permskiy politekhnicheskiy institut. Predstavleno akademikom N.M. Strakhovym.
(Ural Mountains--Rocks, Crystalline and metamorphic)
(Trace elements)

KROTOV, V.A.

Changes in the geographical distribution of the productive forces of Eastern Siberia. Sib.geog.sbor. no.1:40-53 '62.
(MIRA 16:2)

(Siberia, Eastern—Industries, Location of)
(Siberia, Eastern—Economic policy)

BANDMAN, M.K.; BUYANTUYEV, B.R.; POMUS, M.I.; RADNAYEV, G.Sh.; GOLOVKIN, D.A.; GRIGOR'YEVA, A.A.; KHOTOV, V.A.; DONCHENKO, K.Ya.; KORZHUYEV, S.S.; SHATSILO, Ye.S.; KOSMACHEV, K.P.; NAUMOV, G.V.; LIKHANOV, B.N.; PETUKHOV, V.G.; TIKHONOV, A.V.; NEDESHEV, A.A.; SIMANOVSKIY, G.M.; SHAKHUNOVA, P.A.; SHOTSKIY, V.P.; YEROFEYEV, I.A., red.; POLOZHENTSEVA, T.S., mladshiy red.; GOLITSYN, A.B., red. kart; VILENSKAYA, E.N., tekhn. red.

[Eastern Siberia; economic geography] Vostochnaia Sibir'; ekonomiko-geograficheskaia kharakteristika. Moskva, Geografizdat, 1963. 885 p. (MIRA 16:10)
(Siberia, Eastern--Economic geography)

KROTOV, V. A., Irkutsk

"Geographical aspects of industrialization in Siberia."

report scheduled for presentation at the 20th Intl Geographical Cong, 6 Jul-11 Aug 64, London.

KROTOV, V.A., prof., otv. red.; SEPPING, N.G., red.

[Research in medical geography in solving comprehensive geographical problems; symposium materials] Mediko-geograficheskie issledovaniia pri reshenii kompleksnykh geograficheskikh problem; materialy k simpoziumu na... Irkutsk, AN SSSR, 1962. 18 p. (MIRA 17:4)

1. Nauchnoye soveshchaniye geografov Sibiri i Dal'nego Vostoka, 2nd, Vladivostok, 1962.

KROTOV, V.A.

Practical significance of geography in the U.S.A. (in connection with the geography of Siberia). Dokl. Inst. geog. Sib. i Dal'. Vost. no.1:12-22 '62. (MIRA 17:8)

KROTOV, V.A.

Siberian geographers at the international congress in London. Dokl. Inst. geog. Sib. i Dal'. Vost. no.7:72-78 '64. (MIRA 18:10)

BUYANTUYEV, B.R.; GALAZIY, G.I.; KROTOV, V.A.; SHOTSKIY, V.P.

Comprehensive utilization and conservation of the natural resources of lake Baikal. Dokl. Inst. geog. Sib. i Dal'. Vost. no.2:3-13 '62. (MIRA 18:10)

KROTOV, V.A.

Economicogeographical problems of Eastern Siberia.
Sib. geog. sbor. no.4:6-41 '65.
(MIRA 18:12)

KROTOV, V.D., assistent

The problem of using right-angle intersection when plotting the axes of dams and bridges. Trudy DIIT no.32:208-218 '61.
(MIRA 16:2)

(Surveys—Plotting) (Bridge construction)

SOV/124-58-2-1541

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 2, p 8 (USSR)

AUTHOR: Kroto: V. F.

TITLE: The Calculation of an Optimal Rocket Trajectory for Transition to a Prescribed Circular Orbit Around the Earth (Raschet optimal'noy trayektorii dlya perekhoda rakety na zadannuyu krugovuyu trayektoriyu vokrug Zemli)

PERIODICAL: V sb.: Mekhanika (MVTU, Vol 50), Moscow, Oborongiz, 1956, pp 313 334

ABSTRACT: The article considers the variational problem of the finding of a fuel burning regime permitting to place a ballistic rocket in a given orbit with a minimum starting weight on the condition that the thrust be always coincident with the rocket velocity. It is assumed that the trajectory in question consists of a segment corresponding to the starting impulse, an active segment, a passive segment and a section of the final impulse. The author utilizes equations of motion projected upon the tangential and normal directions to the trajectory. As an independent variable the author takes the geocentric radius r ; however, the monotonousness of the

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The Calculation of an Optimal Rocket Trajectory for Transition (cont.)

function r(t) along the trajectory is not demonstrated. The changes in the gravitational acceleration g and the back pressure with the altitude are evaluated by the method offered by D. Ye. Okhotsimskiy (Prikl. matem. i mekhan., 1946, Nr 2); however, the author presents this method as original and states that these factors had not been assessed prior to his work. The equations of motion include the atmospheric density (considered as dependent on the altitude), and contains centrifugal- and Coriolis-force terms. However, the author does not observe that the equations developed are valid only for the case when the given orbit is in the plane of the equator. His contention regarding the applicability of the method "for calculation of the transition into any prescribed plane cosmic trajectory" is erroneous. The final mass of a rocket is considered to be given, and the functional of the problem, i.e., the initial mass in question M_0, is determined by integration of Meshcherskiy's equation written for the projection onto the tangential direction. The equation written for the projection onto the normal direction is considered as a nonholonomic relationship, and the problem is reduced to Lagrange's general problem. The variational problem for the active segment is reduced to the solution of a system containing two differential equations (of the first and third order). However, the derivation of the end conditions is not correct inasmuch as the author does not take into account the variability of the starting

The Calculation of an Optimal Rocket Trajectory for Transition (cont.)

point of the active segment. For the solution of the boundary problem the author offers a specific method. The possibility of obtaining a solution by this method is not rigorously substantiated, and it is not proved that the solution sought actually corresponds to the minimum; also, it is not investigated whether the solution is the only possible one. The author does not analyze the equations developed, the properties, or the peculiarities of the optimal motion, and does not consider any examples. There are misprints, incorrect statements, and errors in the discussion. The formulas are not always explained correctly in the context. Bibliography: 6 references.

V. A. Sarychev, V. A. Yegorov

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KROTOV, V. F.

"Calculation of the Optimal Trajectory for the Transition of a Rocket to a Given Circular Trajectory About the Earth," by Student V. F. Krotov, Mekhanika, No 50, Oborongiz, Moscow, 1956, pp 313-334 (Trudy MVTU)

This work presents equations for the optimal motion of a rocket in its transition from a given point on the surface of the earth to a given orbit; it considers variable density atmosphere and the central field of gravity with variable coefficient $g = k/r^2$.

Krotov formulates the problem, derives first variation expressions, lists the equations of motion of a rocket in the active state, and presents the boundary condition equations.

Sum 1274

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16.4900

AUTHOR: Krotov, V.F.

TITLE: Discontinuous Solutions of Variation Problems

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1960, No. 5, pp, 86 - 98

TEXT: The author considers the extremal problem for

(1) $$I(u) = \int_a^b F(x,y,y')dx$$

on a set U of curves u with the following properties:
1) the x- and y-coordinates of u are continuous functions of a parameter t;
2) y(x) is continuous on u and unique everywhere in the interval $[a,b]$ with the exception of a finite set of points x_i $(i = 0,1,\ldots,n)$ where it may have discontinuities of first kind; 3) $y'(x)$ is continuous almost everywhere on $[a,b]$ and bounded everywhere with a possible exception of the points x_i; 4) it holds

(2) $y(a-0) = a_1$, $y(b+0) = b_1$;

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5) u lies in the domain B of the xy - plane, where $F(x,y,z)$ and F_x, F_y, F_z are continuous in all three arguments.

The integral (1) is defined as follows : Let u_m be the curve u in which all vertical sections are replaced by lines having the inclination $\frac{1}{m}$ and passing through the middle of the vertical section. The function y(x) considered along u_m is denoted with $y_m(x)$; then let

$$(8) \quad I(u) = \lim_{m\to\infty} (L) \int_a^b F(x,y_m(x), y_m'(x))dx$$

The author gives necessary and in some cases sufficient conditions that (1) has an absolute or strongly relative extremum in the class U. It is shown that there exist two kinds of extremals : ordinary ones: i.e. such ones being solutions of the Euler equations for corresponding boundary conditions (type b) and singular ones (type a) with the property that every infinitely small part of them does not depend on the situation of the neighboring parts and has the extremal properties. It is shown that the type b is particularly characteristic for the given problem, while the

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type a is possible only under additional assumptions. The author gives necessary conditions for the existence of the extremals of the type a or b. Simultaneously he investigates the more general problem on the extremum of (1) in the closure U_o of the class U. It is shown that the behavior of the extremal is determined by the functions

(5) $W(x,y, \operatorname{sign} m) = \lim F(x,y,m)^{\frac{1}{m}}$, $|m| \to \infty$, $x,y \in B$

where

$$\operatorname{sign} m = \begin{cases} -1 & \text{for } m<0 \\ \text{so that } W(x,y, \operatorname{sgn} m) = 0 & \text{for } m = 0 \\ 1 & \text{for } m>0 . \end{cases}$$

The author distinguishes several cases in dependence of the fact whether the limit value of (5) exists on [a,b] or not, whether the left and the right limit value are equal everywhere or not everywhere etc. - The author mentions A.M. Razmadze. There is 1 figure and 1 non-Soviet reference.

ASSOCIATION: Moskovskoye vyssheye tekhnicheskoye uchilishche imeni N.E. Baumana (Moscow Secondary Technical School imeni N.E. Baumann)

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SUBMITTED: February 23, 1959

KROTOV, V. F., Cand. Phys-Math. Sci. (diss) "New Method of Variation Computation and Some Additions to It." Moscow, 1961, 14 pp (Acad. of Sci. USSR, Mathematical Institute im V. A. Steklov) 200 copies (KL Supp 12-61, 262).

S/140/61/000/002/004/009
C111/C222

AUTHOR: Krotov, V.F.

TITLE: On discontinuous solutions of variation problems

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, no.2, 1961, 75-89

TEXT: The present paper is a direct continuation of V.F.Krotov (Ref.2: Razryvnyye resheniya variatsionnykh zadach [Discontinuous solutions of variation problems] Izv.vuzov,Matem., no.5 (18),1960).
The author investigates the extremum of the functional

$$I(u) = \int_a^b F(x,y,y')dx, \qquad (1)$$

$$y(a) = a_1,\ y(b) = b_1 \qquad (2)$$

on the set U of curves with vertical pieces. The definition of U is given in (Ref.2). The author considers
Case IV, where the right-hand and left-hand limit value

$$W(x,y,\text{sign } m) = \lim_{m \to \pm\infty} F(x,y,m)\,\frac{1}{m}\,,\ x,y \in B \qquad (3)$$

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are existing and are equal everywhere in B.
Case V, where the limit values (3) are existing but are not equal everywhere in B.
It is shown that for these cases extremals of a special type different from the Eulerian one are characteristic (extremals of the type a). For these extremals every infinitely small part does not depend on the other parts of the extremal and has the extremal property. In particular such an extremal does not depend on the situation of the end points. The equations of these extremals result without the boundary value problem for Eulerian equations directly as necessary extremum conditions; in the case IV they read

$$\left.\begin{aligned} S_y \equiv F_y - W_y z - W_x &= 0, \\ S_z \equiv F_z - W &= 0, \end{aligned}\right\} \qquad (10)$$

and in the case V:

$$\left.\begin{aligned} S_y \equiv F_y(x,y,z) - W_y(x,y,\operatorname{sign}(y'-z))z - W_x(x,y) &= 0, \\ S_z \equiv F_z(x,y,z) - W(x,y,\operatorname{sign}(y'-z)) &= 0. \end{aligned}\right\} \qquad (38)$$

Functions of the case IV have only extremals of the type a. Functionals
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of the case V may also have ordinary extremals (solutions of the boundary value problem for the Eulerian equation). The author gives necessary and sufficient conditions that the weak extremals are also strong.
In order that the functional has a minimum in the class U it is necessary

$$W(x,y,1) = W(x,y,-1) \quad \text{or} \quad W(x,y,\operatorname{sign}\varepsilon)\,\varepsilon \geqslant 0 \qquad (57)$$

along the extremal. Examples are given.
The author mentions A,M.Razmadze. There is 1 figure, 1 Soviet-bloc ari 1 non-Soviet-bloc reference.

ASSOCIATION: Moskovskoye vysshaye tekhnicheskoye uchilishche im.Baumana (Moscow Secondary Technical School im.Bauman)

SUBMITTED: February 23, 1959

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S/549/61/000/104/006/018
D237/D304

AUTHOR: Krotov, V.F.

TITLE: Three theorems on strong minimum in the classical variational problem

SOURCE: Moscow. Vysshiye tekhnicheskoye uchilishche. [Trudy], no. 104, 1961. Mekhanika, 42 - 53

TEXT: The problem of the strong minimum of the functional

$$I = \int_a^b F(x, y_1, \ldots, y_k, y_1', \ldots, y_k') \, dx \qquad (1)$$

is considered, where

$$\left.\begin{aligned} y_1(a) = a_1, \ldots, y_k(a) = a_k; \\ y_1(b) = b_1, \ldots, y_k(b) = b_k, \end{aligned}\right\} \qquad (2)$$

where $y_i(x)$ $(i = 1, 2, \ldots, k)$ are continuous functions possessing piece-wise continuous derivatives. The author's earlier work on the

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theory of discontinuous solutions of variational problems (Ref. 1: IVUZ MVO, 'Matematika', 1960, no. 5, Kazan); (Ref. 2: IVUZ MVO, 'Matematika', 1961, no. 1, Kazan); (Ref. 3: DAN SSSR, 1961, v. 137, no. 1) is utilized here in deriving some properties, and the author studies the dependence of the extremals in the class C_1 which itself is of interest, on the discontinuous extremals in the class U. It is shown that the existence and the character of the minimum in C_1 depends on the character and position of discontinuous extremals (Refs. 1 and 2: Op.cit.). Hence, necessary conditions for the strong minimum of I are derived which, when applicable, are superior to and stronger than the Weierstrass conditions. Three theorems are formulated and proved and 3 examples are worked out, illustrating the applicability and use of the theorems. There are 1 figure and 4 Soviet-bloc references.

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26.3100

AUTHOR: Krotov, V.F.

TITLE: On the optimum conditions of horizontal airplane flight

SOURCE: Moscow. Vyssheye tekhnicheskoye uchilishche. [Trudy], no. 104, 1961. Mekhanika, 54 - 66

TEXT: The author applies the theory of discontinuous solutions of variational problems, developed by him, to the problem of optimal programming of the engine in the horizontal flight of an aircraft. The method is given for direct determination of optimum conditions for various relationships between the propulsion force and fuel consumption. In the case of the linear dependence, optimum conditions coincide with those obtained by P. Chikala and A. Miyele (Ref. 5: Sb. Issledovaniye optmalnykh rezhimov dvizheniya raket, Oborongiz, 1959); but new necessary and sufficient conditions of the absolute maximum distance which appear as the condition of the maximum of the function of one variable $S(m, j, v^o)$ for any fixed value of m, are much more suitable for the numerical work. In case

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of non-linear relations the author shows that the results obtained by P. Chikala are false and obtains optimal regimes of so-called 'intermittent propulsion' which cannot be derived by the classical variational methods. The most important practical consequence is, according to the author, the discovery of new 'intermittent propulsion' regimes in the problems of optimum programming. It is stated that the practical example of deficiency or even incorrectness of classical variational methods when applied to problems on optimal programming, is important from the mathematical point of view. The author expresses his gratitude to Professor V.V. Dobronravov for valuable advice in preparing the manuscript. There are 5 figures and 5 Soviet-bloc references.

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S/020/61/137/001/004/021
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AUTHOR: Krotov, V.F.

TITLE: The principal problem of the calculus of variations for the simplest functional on a set of discontinuous functions

PERIODICAL: Akademii nauk SSSR. Doklady, v. 137, no.1, 1961, 31-34

TEXT: The author investigates the extremum of

$$I(u) = \int_a^b F(x,y,y')dx \qquad (1)$$

on the curves $u \in U$, where the local coordinates x,y of u are continuous, y(x), however, may have discontinuities of first kind in a finite number of points x_i ($i = 1,2,\ldots, k$) on $[a,b]$, while $y'(x)$ is continuous and bounded on the partial intervals (x_i, x_{i+1}). Furthermore it is assumed that $F(x,y,z)$, F_x, F_y, F_z are continuous for all z in a certain region B of the XY-plane, and that all $u \in U$ lie in B ; everywhere in B there exist the limit values

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The principal problem of the calculus ....

$$W(x,y, \text{sign } m) = \lim_{m \to \pm\infty} \frac{1}{m} F(x,y,m) \qquad (2)$$

which are uniformly bounded in every finite subregion of R.
Definition 1 : The functional (1) of $u \in U$ is the limit value

$$I(u) = \lim_{m \to \infty} I(u^m) , \qquad (3)$$

where u^m is an n-line the vertical parts of which are inclined to the vertical with the angle $1/m$ so that $y(x)$ is unique along u^m .
The functional defined in this way exists on every $u \in U$. Let y_n be the polygon $y_n(x) = y_i + y_i' (x - x_i)$ for $x_i < x < x_{i+1}$ $(i = 0,1,\ldots, n-1)$ (cf. figure 1)

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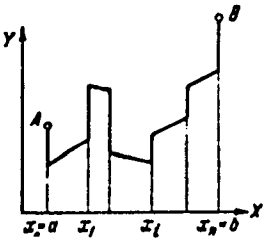
Fig. 1



Definition 2 : Let $u \in U$ be described by $y(x)$. Let $y_n \to u$ resp. $y_n(x) \to y(x)$ if $y_i = y(x_i + 0)$; $y_i' = y'(x_i + 0)$, $|x_{i+1} - x_i| < \varepsilon$ for $n > N$.

Definition 3 : Given $y^0(x) \in U_n$ and $z(x)$ be a function bounded and continuous on the intervals $(a,x_1),\ldots, (x_i, x_{i+1}),\ldots, (x_k, b)$. Furthermore let $\{\bar{\gamma}_n\} \subset \{\gamma_n\}$ be a sequence of polygons so that

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The principal problem of the calculus ...

$$y_i = y^o(x_i + 0) \; ; \; y'_i = z\,(x_i + 0) \; ; \; x_{i+1} - x_i < \delta \qquad (5)$$

holds for $n > N$. In this case it is said that $\gamma_n \to u_o \in U_o$. The limit value u_o is called a (y^o,z)-line. The set U_o is called the closure of the set $\{\gamma_n\}$. It holds $U \subseteq U_o$.

Definition 4 : Let the functional (1) of $u_o \in U_o$ be defined by

$$I(u_o) = \lim_{\gamma_n \to u_o} I\{\gamma_n\} \; . \qquad (6)$$

Theorem 1 : If the right and left limit value (2) exist everywhere in $B(x,y)$ and if $W(x,y,1) = W(x,y,-1)$, then (6) exists everywhere on U_o and can be represented in the form

$$I(u_o) = (R) \int_a^b S(x,y^o,z)dx + \varphi(b,b_1) - \varphi(a,a_1) \quad , \qquad (7)$$

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where

$$S(x,y^0,z) = F(x,y^0,z) - W(x,y^0)z - \int_{o(\bar{x})}^{y^0} W_x(x,\xi)d\xi + W[x,c(x)]c'(x) \qquad (8)$$

$$\phi(x,y) = \int_{o(\bar{x})}^{y} W(x,\xi)d\xi \quad , \qquad (9)$$

and c(x) denotes an arbitrary smooth function.

Theorem 2 : If the right and left limit value (2) exist everywhere in B(x,y) and if $W(x,y,1) \neq W(x,y,-1)$ then (1) exists everywhere on U_o and can be represented in the form

$$I(u_0) = \sum_{i=1}^{h-1}(R)\int_{x_i+0}^{x_{i+1}-0}|F(x,y,z)+W(x,y,\operatorname{sign}(y'-z))(y'-z)|\,dx +$$

$$+\sum_{i=1}^{h}\int_{\bar{y}_i}^{y_i} W(x_i,\xi,\operatorname{sign}(y_i-\bar{y}_i))\,d\xi + \int_{a+0}^{x_1-0}|F+W(x'-z)|\,dx +$$

$$+\int_{x_h+0}^{b-0}|F+W(y'-z)|\,dx. \qquad (11)$$

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The principal problem of the calculus ...

Theorem 3 : Let $\inf I(u_0) = m > -\infty$, $u_0 \in U_0$ and let v be the extremal of (1) in the class U_0 , i.e. $I(v) = m$. Then v is extremal in U too, i.e. $\inf_{u \in U} I(u) = I(v)$. Inversely : If v is extremal in U then it is so in U_0 .

Theorem 4 : Let the assumptions of the theorems 1 and 3 be satisfied. In order that (1) on $\overline{u}_0 \in U_0$ has an absolute or relative extremum in the classes U and U_0 it is necessary and sufficient that the function $S(x,y^0,z)$ has a corresponding extremum for every fixed $x \in [a,b]$. More exact :

$$S(x,\overline{y}^0,\overline{z}) = \inf S(x,y^0,z), \quad y^0 \in B, \quad -\infty < z < \infty \tag{13}$$

for an absolute minimum.

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The principal problem of the calculus ...

There is 1 figure.

ASSOCIATION: Moskovskoye vyssheye tekhnicheskoye uchilishche imeni N.E. Baumana (Moscow School of Higher Technical Education imeni N.E. Bauman)

PRESENTED: September 5, 1960, by A.N. Kolmogorov, Academician

SUBMITTED: October 21, 1960

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28724
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C111/C222

16.4900

AUTHOR: Krotov, V. F.

TITLE: The absolute minimum of functionals on a set of functions with a bounded derivative

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 3, 1961, 525-528

TEXT: The author seeks the absolute minimum of

$$I(u) = \int_a^b F(x,y,p)\,dx \qquad (1)$$

on the set U^p of the piecewise smooth curves satisfying

$$y' = g(x,y,p);\ |p| \leq 1;\ y(a) = a_1,\ y(b) = b_1 \qquad (2)$$

where $F(x,y,p)$ and $g(x,y,p)$ are continuous for $|p| \leq 1$ and arbitrary x,y together with their partial derivatives with respect to x,y,p and besides it holds

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$$\frac{\partial g}{\partial p} > 0; \qquad (3)$$

The absolute minimum of functionals on... the functions $g(x,y,\pm 1)$ have a constant sign.

Let

$$y = \varphi(x,\tau);\ y = \psi(x,t) \qquad (5)$$

be the solutions of the first and second equation, respectively,

$$y' = g(x,y,1)\ ;\ y' = g(x,y,-1), \qquad (4)$$

(τ and t are constants of integration). Along every $u \in U^p$, $y = \varphi(x,\tau)$ defines a piecewise smooth $x = x(\tau)$, having discontinuities of first kind for values $\tau = \mu_i$ $(i = 1,2,\ldots,n)$ corresponding to the domains $p(x) \equiv 1$ of u. Introducing in (1), (2) the new independent variable then one obtains

$$I(u) = \sum_{i=1}^{n} \int_{\mu_i+0}^{\mu_{i+1}-0} F_1(\tau,y,p)\, d\tau + \sum_{i=1}^{n} \Phi(\mu_i,y_i,\bar{y}_i) \qquad (3)$$

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The absolute minimum of functionals on...

$$\dot{y} \equiv \frac{dy}{dt} = g_1(\tau, y, p); \quad |p| \leq 1; \quad \mu_1 \equiv \alpha = \tau(a, a_1); \quad \mu_n \equiv \beta = \tau(b, b_1) \qquad (7)$$

where

$$F_1 = F(\varphi_1(\tau, y), y, p) \frac{\varphi_{1\tau} g(\varphi_1, y, 1)}{g(\varphi_1, y, 1) - g(\varphi_1, y, p)}; \qquad (8)$$

$$g_1 = g(\varphi_1, y, p) \frac{\varphi_{1\tau} g(\varphi_1, y, 1)}{g(\varphi_1, y, 1) - g(\varphi_1, y, p)}; \qquad (9)$$

$$\Phi(\tau, y, \bar{y}) = \int_{\bar{x}}^{x} F(x, \varphi(x, \tau), 1)\, dx = \int_{\bar{y}}^{y} \frac{F(\varphi_1(\tau, \eta), \eta, 1)}{g(\varphi_1(\tau, \eta), \eta, 1)} d\eta; \qquad (10)$$

$$y = y(\tau + 0); \quad \bar{y} = y(\tau - 0); \qquad (11)$$

and $x = \varphi_1(\tau, y)$ is the reversion function of $y = \varphi(\tau, x)$. Expressing

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$p(\tau,y,\dot{y})$ out of (7) and substituting into (8) then one obtains $F_1(\tau,y,\dot{y})$ as the integrand. It holds

$$W(\tau,y) = \lim_{\dot{y}\to\infty} F_1(\tau,y,\dot{y})\,\frac{1}{\dot{y}} = \frac{F(\varphi_1,y,1)}{g(\varphi_1,y,1)}\,. \qquad (12)$$

Let U^τ be the set of piecewise smooth curves on which $y(\tau)$ is unique everywhere with the exception of the points μ_1 where it has discontinuities of first kind. It holds $U^p \subset U^\tau$. Let $I(u)$, $u \in U^\tau$ be defined by (6). The author considers the set of the (y,z)-curves U_o^τ, where $y(\tau)$ is the function of zero approximation of the curve $u_o \in U_o^\tau$ and $z(\tau)$ is its local inclination in the coordinates τ, y (cf.(Ref.1: V. F. Krotov, DAN, 137, no. 1, 31 (1961); definition 3)).

Let

$$S(\tau,y,z) = \tilde{F}_1(\tau,y,z) - W(\tau,y)z - \int_0^y W_\tau(\tau,\eta)\,d\eta \qquad (13)$$

where c is an arbitrary constant. The magnitude q defined by

$$z = g_1(\tau, y, q) \qquad (14)$$

is called the local value of p. Substituting (14) into (13) then it follows

$$S = F_1(\tau, y, q) - F_1(\tau, y, 1)\frac{g(\tau, y, q)}{g(\tau, y, 1)} - \int_c^y \left[\frac{F(\varphi_1(\tau, \eta), \eta, 1)}{g(\varphi_1(\tau, \eta), \eta, 1)}\right] d\eta . \qquad (15)$$

Lemma: Given the (y,q)-line $u_o \in U^{\tau}$. For the existence of a sequence of polygons $\{\gamma_n\} \to u_o$, $\{\gamma_n\} \subset U^p$ it is necessary and sufficient that $y(\tau)$ and $q(\tau)$ satisfy the conditions

$$q(\tau) \geq 1; \quad \dot{y} - g_1(\tau, y, q) \geq 0 \qquad (16)$$

in the points of continuity of $y(\tau)$ and

$$y(\mu_i) - \overline{y}(\mu_i) \geq 0 \qquad (17)$$

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in the points of discontinuity of $y(\tau)$.

Let $\tilde{u} \in U_o^{\tau}$ be a (y,q)-line satisfying the condition

$$S(\tau,\tilde{y},\tilde{q}) = \inf S(\tau,y,q),\ \Gamma_1(\tau) \leq y \leq \Gamma_2(\tau);\ |q| \leq 1 \qquad (18)$$

for every fixed $\tau \in (\alpha, \beta)$.

Theorem 1: Let the (y,q)-line $\tilde{u} \in U_o^{\tau}$ satisfy (16), (17), (18). Then $\tilde{u}$ is the absolute minimal of (1), i. e.

$$I(\tilde{u}) = \inf_{u \in U^p} I(u), \qquad (19)$$

with

$$I(\tilde{u}) = \int_{\alpha}^{\beta} S(\tau,\tilde{y},\tilde{q})\,d\tau + \phi(\beta,b_1) - \phi(\alpha,a_1). \qquad (20)$$

Theorem 2: Let $[\tau_1,\tau_2] \in [\alpha,\beta]$ be an isolated line segment on which the $\tilde{y}(\tau),\tilde{q}(\tau)$ given by (18) satisfy the conditions (16), (17). Let v be

The absolute minimum of functionals on...

defined as follows: 1) on $[\alpha, \tau_1]$ v is identical with the absolute minimal v_1 of

$$I_1(u_1, y_1) = \int_a^{\tau_1} F_1(\tau, y, p)d\tau - \phi(\tau_1, y_1) \quad (21)$$

(y_1 is movable in (21)); 2) on $[\tau_1, \tau_2]$, v is the (y,q)-line: $y = \tilde{y}(\tau)$, $q = \tilde{q}(\tau)$; 3) on $[\tau_2, \beta]$, v is identical with the absolute minimal v_2 of

$$I(u_2, y_2) = \int_{\tau_2}^{\beta} F_1(\tau, y, p)d\tau + \phi(\tau_2, y_2) \quad (22)$$

with a movable y_2. If

$$y_1 \leq \tilde{y}(\tau_1); \quad y_2 \geq \tilde{y}(\tau_2) \quad (23)$$

then it holds

$$I(v) = \inf I(u), \; u \in U^p \; , \quad (24)$$

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analogous theorems hold in the t,y-plane.

There are 3 Soviet-bloc references.

ASSOCIATION: Moskovskoye vyssheye tekhnicheskoye uchilishche imeni N. E. Baumana (Moscow Secondary Technical School imeni N. E. Bauman)

PRESENTED: May 8, 1961, by L. S. Pontryagin, Academician

SUBMITTED: May 3, 1961

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S/103/62/023/012/001/013
D201/D308

AUTHOR: Krotov, V.F. (Moscow)

TITLE: Methods of solution of variational problems on the basis of sufficient conditions of absolute minimum. I.

PERIODICAL: Avtomatika i telemekhanika, v. 23, no. 12, 1962, 1571 - 1583

TEXT: The author considers the problem of absolute minimum of function

$$J = \int_0^{t_1} f^0 (t, y, u)\, dt + F (y_0, y_1). \qquad (1)$$

The vector-functions pair $y(t)$ and $u(t)$ must satisfy the system of n differential equations

$$\dot{y} = f (t, y, u), \qquad (3)$$

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Methods of solution ...

The sufficient conditions of optimization of such systems are derived and on their basis some of the fundamental algorithms of solution of variational problems are considered: the Lagrange formal solution and the Hamilton-Jacobi-Bellman solution. The last method is used for full solution of optimal synthesis of systems, linear with respect to the phase coordinates, operating during a certain time with the minimum value of the functional. For a particular linear problem of determining the minimum of functional (1), on condition that the initial y_0 and final y_1 vectors are given and the domain B(t) of space, t, y is unbounded ($o < t < t_1$), the result is the same as that obtained by L.I. Rozonoer (Dokl. AN SSSR, v. 127, no. 3, 1959) who used very cumbersome analysis of increments of the functional. There is 1 figure.

SUBMITTED: May 3, 1962

Card 2/2

KHOTOV, V. F.

Dissertation defended for the degree of Candidate of Physicomathematical Sciences at the Mathematical Institute imeni V.A. Steklova 1962:

"New Method of Calculus of Variations and Several of Its Applications."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

KROTOV, V.F. (Moskva)

Methods for solving variational problems based on the adequate conditions of absolute minimum. Part 1. Avtom.i telem. 23 no.12:1571-1583 D '62. (MIRA 15:12)
(Automatic control)

L 10278-63 BDS/EWT(d)/FCC(w)--AFFTC--IJP(C)
ACCESSION NR: AP3000462 S/0103/63/024/005/0581/0598

AUTHOR: Krotov, V. F. (Moscow) 52

TITLE: Methods for solving variational problems. 2-Sliding conditions

SOURCE: Avtomatika i telemekhnika, v. 24, no. 5, 1963, 581-598

TOPIC TAGS: calculus of variations, mathematics in automation

ABSTRACT: General formalism of sufficient optimal conditions as suggested by the same author (Methods for solving variational problems based on the absolute-minimum sufficient conditions 1., Avtomatika i telemekhanika, vol 23, No 12, 1962) is extended over the case when there is no minimal in the class of permissible functions. Characteristics of minimizing sequences (sliding optimum conditions) are investigated, and various methods are suggested for finding such conditions; the methods permit completing the solution. An optimality principle is formulated and proposed as a necessary and sufficient condition for finding the absolute minimum of a functional by the methods of the calculus of variations. The possible technical applications of the above mathematical method are: (1) an intermittent thrust in the maximum-range flight of an

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L 10278-63
ACCESSION NR: AP3000462

aircraft and (2) the optimum rate of pressworking or stamping. Orig. art. has: 49 equations.

ASSOCIATION: none

SUBMITTED: 25Sep62 DATE ACQ: 12Jun63 ENCL: 00

SUB CODE: MM,AI NR REF SOV: 009 OTHER: 000

Card 2/2

ACCESSION NR: AP4042489 S/0103/64/025/007/1037/1046

AUTHOR: Krotov, V. F. (Moscow)

TITLE: Methods of solving variational problems for sufficient conditions of an absolute minimum. Part 3

SOURCE: Avtomatika i telemekhanika, v. 25, no. 7, 1964, 1037-1046

TOPIC TAGS: automatic control, automatic control design, automatic control system, automatic control theory

ABSTRACT: A method set forth earlier (Avtomatika i telemekhanika, v. 23, no. 12, 1962, and v. 24, no. 5, 1963) is generalized in the present article to cover the variational problems for systems described by partial differential equations. The optimization of distributed parameter systems can be reduced to such a variational problem. A sufficient condition is formulated for the absolute minimum of this functional:

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$$J[y(x), u(x)] = \int_{\lambda} f^0(x, y, u)\,dx + F[y_s(x)],$$

where the function $f^0(x, y, u)$ is defined and is continuous on W; $F[y_s(x)]$ is the functional which depends upon the values $y_s(x)$ of the function $y(x)$ on the surface S. On the basis of the above absolute-minimum condition, the Lagrange formalism and the Hamilton-Jacobi-Bellman formalism for solving variational problems are considered. Orig. art. has: 60 formulas.

ASSOCIATION: none

SUBMITTED: 05Jul63 ENCL: 00

SUB CODE: DP , IE NO REF SOV: 001 OTHER: 000

Card 2/2

L 17005-66 EWT(d)/EWP(1) IJP(c) GS/BC

ACC NR: AT6003674 SOURCE CODE: UR/0000/65/000/000/0217/0236

AUTHOR: Krotov, V. F.; Gurman, V. I.

ORG: none

TITLE: On optimal sliding modes in variational problems of flight dynamics

SOURCE: Issledovaniya po dinamike poleta (Research on flight dynamics), no. 1. Moscow, Izd-vo Mashinostroyeniye, 1965, 217-236

TOPIC TAGS: variational problem, flight mechanics, aircraft

ABSTRACT: The purpose of this article is to demonstrate the existence of optimal sliding modes in variational problems in flight dynamics in the atmosphere, in cases in which the control is the angle-of-attack of the aircraft. The study is made on the basis of a theory outlined elsewhere. In the course of the investigation certain techniques are demonstrated which can be conveniently employed in the study of sliding modes and degenerate problems in general. It is, moreover, pointed out that these modes are typical of some problems. In formulating and solving variational problems in flight dynamics, the possibility of an optimal sliding mode, regardless of whether the mode is practicably feasible or not should

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always be considered. In this case the appearance of a sliding mode indicates that the initial suppositions and the formulation of the problem are to be reviewed. The presence in the optimum condition of sliding mode segments is shown to complicate the investigation to some degree, since this mode always entails a degeneration and artificiality of the solutions, which are capable of satisfying certain necessary optimum conditions, but are not all actually optimal. In such cases, both the classical variation calculus methods and their familiar generalizations are found to be ineffective. The final solution of the problem in such cases can be achieved only with the help of more stringent necessary and sufficient conditions for the optimum, one of which is the principle of optimality used in this paper. Orig. art. has: 3 figures and 54 formulas.

SUB CODE: 01, 12 / SUBM DATE: 02Aug65 / ORIG REF: 008

A [illegible] synthesis of an optimal [illegible]

SOURCE: Avtomatika i telemekhanika, v. 25, no. 11, 1964. 1521-1527

TOPIC TAGS: automatic control, automatic control design, automatic control system, automatic control theory, optimal automatic control

ABSTRACT: A regular algorithm is found for an approximate synthesis of the optimal field of controls $\bar{u}_{\Sigma}(t, y)$. The algorithm consists of these three steps: (1) Given are m arbitrary curves $y_s(t)$, i.e., m points in a space Y at every fixed $t \in [0, t_1]$, more or less uniformly covering the region $B_2(t)$ in such a way [illegible] equation 3, 3 is not zero. (2) A [illegible] problem is solved for a set [illegible] ordinary differential equations with initial conditions [illegible] the set is solved [illegible] from t_1 toward [illegible] by using formula 4 [illegible] zero control

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ACCESSION NR: AP5000144

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[illegible] be determined. (3) The number $\lambda_n(t_0)$ [illegible] is determined from formula [illegible] equals 2 [illegible] the proximate [illegible] [illegible] synthesis $\tilde{u}_n(t, y)$ [illegible] Orig. art. has [illegible]

ASSOCIATION: none

SUBMITTED: 16Aug63

ENCL: 00

SUB CODE: IE

NO REF SOV: 002

OTHER: 000

Card 2/2

MASLOV, V.Ye., kand.tekhn.nauk; SAL'KOV, P.G., kand.tekhn.nauk; PROTSAYLO, M.Ya., inzh.; SMORGUNOV, M.P., inzh.; KROTOV, V.I., inzh.; OSTROMOV, A.M., inzh.; SHESTAKOV, V.M., inzh.

Experience in burning brown coals in wet-bottom furnaces with shaft-type impact mills. Teploenergetika 10 no.2:15-19 F '63. (MIRA 16:2)

1. Vostochnyy filial Vsesoyuznogo teplotekhnicheskogo instituta, Chelyabinsk, Krasnoyarskenergo i Vsesoyuznyy nauchno-issledovatel'skiy teplotekhnicheskiy institut.
(Boilers) (Furnaces) (Lignite)

KROTOV, V. R.

24099 KROTOV, V. R. Skrapery na stroitel'stve lesovoznykh dorog. Les prom-st', 1949, No. 7, S. 7-9.

SO: Letopis, No. 32, 1949.

KROTOV, Vladimir Romanovich,; GONCHAROV, A.F.,red.; PITERMAN, Ye.L.,red. izd-va,; SHIFS, V.P., tekhn.red.

[Constructing narrow-gauge logging railroads] Organizatsiia stroitel'stva lesovoznykh zheleznykh dorog uzkoi kolei. Moskva, Goslesbumizdat, 1958. 210 p. (MIRA 11:12)
(Railroads, Narrow-gauge)
(Lumber--Transportation)

GASTEV, Vladimir Romanovich; TORGOVSKIY, Mikhail Nikolayevich; GA[illegible] B.G., doktor tekhn.nauk, prof., retsenzent; GAVRILOV, I.I., inzh., retsenzent; TOVSTOLUZHSKIY, N.I., red.; PITERMAN, Ye.L., red. izd-va; GRECHISHCHEVA, V.I., tekhn. red.

[Organization of the construction of logging roads] Organizatsiia stroitel'stva lesovoznykh dorog. Moskva, Goslesbumizdat, 1962. 262 p. (MIRA 16:6)

1. Zaveduyushchiy kafedroy sukhoputnogo transporta lesa L'vovskogo lesotekhnicheskogo instituta (for Gastev). 2. Nachal'nik mekhanizatsii stroitel'stva lesozagotovitel'nykh predpriyatiy TSentral'nogo nauchno-issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy promyshlennosti (for Gavrilov).
(Forest roads--Design and construction)

SHAKOV, Aleksey Timofeyevich; BLINOV, O.S., retsenzent; BAZICHENKO, L.P., retsenzent; KHOTOV, V.R., red.

[Manual for bulldozer, scraper, and grader operators] Posobie bul'dozeristu, skreperistu i greideristu. Moskva, Goslesbumizdat, 1963. 153 p. (MIRA 17:6)

TORGONSKIY, Mikhail Nikolayevich, [illegible], kand. tekhn. nauk; KUZOV, V.M., inzh., retsenzent; ZINKEVICH, B.A., inzh., retsenzent

[Management of construction operations] Proizvodstvo stroitel'nykh rabot. Moskva, Lesnaia promyshlennost', 1965. 332 p. (MIRA 18:10)

KROTOV, V.S.

Biotite granites of Kislovodsk. Doklady Akad.Nauk S.S.S.R. 84,789-91 '52. (MLRA 5:7)
(CA 47 no.17:8604 '53)

1. A.M. Gorki State Univ., Molotov.

Krotov, V. S.

MM 508

Two-step crystallization in the trachyliparites of Mt. Beshtau. V. S. Krotov (A. M. Gorkii State Univ., Molotov). *Doklady Akad. Nauk S.S.R.* 84, 1227-30(1952); cf. A. P. Gerasimov, *Trudy Tsentral. Nauch.-Issledovatel. Geol.-Razvedochn. Inst.*, 1935, 1937.—The effusive trachyliparites show sanidine, anorthoclase, hornblende, and quartz as phenocrysts, in a micrographitic ground mass. The sanidine has $2V$ variable between 24° and 42°, optically neg., some Karlsbad twins. The anorthoclase shows Esterel or albite-Esterel twinnings; optically neg., $2V$ 35-64°. The hornblende is changed to opacite. The planimetric detn. of the mineral compn. of the rock shows groundmass 73.7, sanidine 19.4, anorthoclase 4.0, hornblende 2.4, and quartz 0.5%. The trachyliparite is the porphyric residual melt from the magma laccolith of Beshtau; it is anchieutectic and shows in its chem. compn. the consanguinity with trachyliparites of Pyatigorsk. Seven analyses of isolated minerals (sanidine, anorthoclase, and hornblende) are given; the sanidine contains 3.84% Na_2O and 10.20% K_2O; the anorthoclase contains 8.28% Na_2O and 2.01% K_2O; and the hornblende contains 1.08% Na_2O and 1.15% K_2O. The Beshtau laccolith magma shows a characteristic crystn. sequence in 2 steps. W. Eitel

Geology of the sheets Andranofanjava and Diego Suarez. Jacques de Saint-Ours (Bur. géol., Tananarive, Madagascar). *Haut Commissariat Madagascar et dépendances, Trav. Bur. géol.* No. 37, 44 pp.(1952).—A reconnaissance report on an area of 3500 sq. km. Rhyolites, trachytes, basalts, and basanites are described, with chem. analyses of 7 rocks. Michael Fleischer

KROTKOV, V.V.; POLOSIN, V.S.

New variations of experiments for the study of flame. Khim. v shkole 18 no.5:42-48 S-O '63. (MIRA 17:1)

KROTOV, V.V.; MOLODTSOV, N.K.

Pneumatic equipment designed for loading charcoal into freight cars. Gidroliz. i lesokhim. prom. 8 no.2:20-21 '55.
(MLRA 8:10)

1. Syavskiy lesokhimicheskiy kombinat
(Charcoal--Transportation)

25(

SOV/117-59-8-9/44

AUTHOR: Krotov, V.V., Director

TITLE: Let Us Supply Industry with Perfect Equipment

PERIODICAL: Mashinostroitel', 1959, Nr 8, pp 3-4 (USSR)

ABSTRACT: The article tells of the part played by the Uralmashzavod in supplying industry with the equipment it needs. In one year, 75% of all the mined ore was processed and 80% of the obtained oil was extracted, with the aid of equipment produced by Uralmashzavod. Seventy-five percent of the blast furnaces are fitted with equipment from this plant. Rolling equipment provided by the plant ensures the rolling of 12 million tons of metal. The rolling mills at present being turned out by the Uralmashzavod are better, as to degree of mechanization and automation of technological process, than foreign rolling mills. Their productivity is 20 to 30% higher. The plant is also making open cast mining excavators with

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buckets of 3 to 8 m^3 capacity, and also powerful walking excavators with 10 to 14 m^3 buckets. The world's largest excavator (with a 25 m^3 bucket and a 100 m long jib) has also been made by the plant. A 50 m^3 bucket excavator with a 125 m jib is planned, as is an automatic blooming mill. Since 1946, the Uralmashzavod has provided the oil industry with powerful drilling machines for well drilling to a depth of 5,000 m. For the first time in the Union, a unit has been constructed for the sinking of vertical mine shafts with all the operations mechanized. A series of large presses has been made, including a vertical press of 30,000 tons pressure, and a horizontal one of 12 thousand tons pressure. During the seven-year plan period, 50 rolling mills will be constructed. In 1960, the plant will start the production of sintering machines with a 200 m^2 sintering surface. In 1960, the production will also be started of equipment for unique

Let Us Supply Industry with Perfect Equipment

blast furnaces, 2,286 m^3 in volume, ensuring the smelting of 1,700 thousand tons of pit iron per year. The "brigade" (team) of presser Vladimir Moiseyev and the brigade of turners under Nikolay Tyulenev were the first to join the movement (initiated by the people of Moscow) to work and live in a communist way. Gear-cutter K.Ya. Masliy initiated the movement for drawing up complex plans to increase the productivity of labor at every machine unit and every working place. Engineers N.Belykh and V. Bykov took part in designing a pipe rolling mill and rail-and-beam mill for China. The members of the designing department, under the leadership of engineer A. Lipatov, lowered the weight of machines developed during the four months of this year by 700 tons.

ASSOCIATION:Uralmashzavod

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KROTOV, V.V.

Improving production management in the machinery industry of Middle Ural Economic Region. Biul. tekh.-ekon.inform.Gos.nauch.-issl.inst. nauch. i tekh.inform. 18 no.6:53-56 Je '65. (MIRA 18:7)

KROTOV, V.Yu.; BARTUSYAVICHENE, A.S. [Bartusiavičenes, A.S.]

Report on the activity of the Vilnius Society of Roentgenologists and Radiologists in 1960. Vest.rent.i rad. 36 no.3:75 My-Je '61. (MIRA 14:7)

1. Predsedatel' pravleniya Vil'nyusskogo gorodskogo nauchnogo obshchestva rentgenologov i radiologov (for Krotov). 2. Sekretar' pravleniya Vil'nyusskogo gorodskogo nauchnogo obshchestva rentgenologov i radiologov (for Bartusyavichene).
(VILNIUS—RADIOLOGICAL SOCIETIES)